January 2000

Effect of Dry, Wet, or Rehydrated Corn Bran on Performance of Finishing Yearling Steers

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The form of corn bran (dry, wet, or rehydrated) used in the production of wet corn gluten feed has limited influence on nutritional value of the finished product.

Summary

Sixty steers were individually fed finishing diets to evaluate if corn bran form affects the energy value of wet corn gluten feed. Corn bran replaced 40% (DM basis) dry-rolled corn as dry (86% DM), wet (37% DM), or rehydrated (37% DM). Dry matter intake was higher for steers fed dry bran compared with other treatments. Daily gain and efficiency were 15 and 18% higher for the control diet compared with the average of corn bran diets. Gain and efficiency were similar among corn bran diets. Corn bran form has limited influence on the energy value of wet corn gluten feed.

Introduction

Corn bran and steep liquor with distillers solubles are combined in various proportions to produce wet corn gluten feed. The use of wet corn gluten feed to replace grain and forage in finishing diets has been widely adopted by Nebraska cattle feeders. Wet corn gluten feed can be produced from corn bran that is wet, about 40% dry matter, or corn bran that has been dried to about 85% dry matter prior to the addition of corn steep liquor/distillers solubles. The main purposes for drying the corn bran are to reduce the DM variation of a gluten feed product and to facilitate the incorporation of more steep liquor/distillers solubles into the wet corn gluten feed product. In general, when wet corn bran is used in the production of wet corn gluten feed, the amount of steep liquor/distillers solubles that can be added to the corn bran is limited due to ingredient separation.

Drying wet corn gluten feed or wet distillers to 10% moisture reduces the energy value compared to when these byproducts are fed in the wet form. Our objectives were to evaluate the influence of drying on the feeding value of corn bran fed in the presence of a constant level of corn steep liquor with distillers solubles.

Procedure

Sixty crossbred, yearling steers (623 lb) were individually fed using Calen gates in a completely randomized designed experiment to compare dry, wet, and rehydrated corn bran in feedlot finishing diets. Corn bran was fed at 40% of the dietary dry matter, replacing equal proportions of high-moisture and dry-rolled corn (Table 1). Dry and wet corn bran were produced from a wet milling plant located in Blair, NE (Cargill Corn Milling). The dry matter contents of the corn bran were 86% and 37% for the dry and wet corn bran, respectively. Rehydrated corn bran was produced by the addition of water, prior to bagging, to dry corn bran until the dry matter content was similar to the wet corn bran (37%). All forms of corn bran were stored in silo bags. All diets were formulated to contain a minimum of 12.5% crude protein, .7% calcium, .3% phosphorous, .6% potassium, 27 g/t Rumensin, and 10 g/t Tylan (DM basis). Corn steep liquor with distillers solubles (*Sweet Steep*) was included as an individual ration ingredient, fed at 9% of the dietary dry matter across all treatments. Initial weights were the average of three consecutive early morning weights taken prior to feeding. Steers were implanted with Synovex® Plus™ at the initiation of the experiment and fed experimental diets for 146 days. Steers were started on their respective finishing diet, and adapted to full-feed by increasing the finishing ration .5 to 1 lb/head/day until

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Table 1. Composition of finishing diets (DM basis).

	Treatment[a]			
Ingredient	Control	Dry Bran	Rehy Bran	Wet Bran
Dry-rolled corn	45.3	21.3	21.3	21.3
High-moisture corn	30.2	14.2	14.2	14.2
Alfalfa hay	7.5	7.5	7.5	7.5
Dry corn bran	—	40.0	—	—
Wet corn bran	—	—	—	40.0
Rehydrated corn bran	—	—	40.0	—
Sweet Steep	9.0	9.0	9.0	9.0
Tallow	3.0	3.0	3.0	3.0
Supplement	5.0	5.0	5.0	5.0
Ration Dry Matter, %	79	80	62	62

[a]Rehy=Corn bran rehydrated to similar moisture concentration compared with wet bran.

steers were at ad libitum consumption. Final weights were determined by dividing hot carcass weight by a common dressing percentage (63). Hot carcass weights were recorded at the time of slaughter, and 12th rib fat thickness, USDA yield and quality grades, and marbling score were determined following a 24-hour chill. Dietary NEg values were calculated using the 1996 NRC equations based on observed dry matter intake and daily gain. Statistical analyses of the data were conducted with the General Linear Model of SAS.

Results

Results of performance and carcass characteristics are presented in Tables 2 and 3, respectively. Dry matter intake was higher ($P < .05$) for steers fed dry corn bran compared with wet or rehydrated corn bran or the corn control (Table 2). Daily gain and feed efficiency were similar among the three forms of corn bran. Steers fed the corn control diet gained 15% faster and were 18% more efficient compared with the average of those consuming diets containing corn bran ($P < .05$). Based on actual dry matter intake and daily gain, the dietary NEg concentration of the diets containing corn bran was 19% lower ($P < .05$) than the corn control diet. The dietary NEg concentrations of the corn bran diets were similar. Using a NEg value of 70 Mcal/cwt for corn, these data suggest that corn bran had a NEg value of 52 Mcal/cwt, approximately 65% of the NEg value for corn grain. Previous Nebraska experiments (1997 Nebraska Beef Report pp.72) have demonstrated that approximately 15% dry bran inclusion in corn-based diets enhanced performance by reducing acidosis, but inclusion levels up to 30% of the dietary dry matter resulted in NEg values for corn bran approximately 80% of corn grain. The higher levels (40% DM basis) of corn bran fed in this experiment would have been more than adequate to reduce any deleterious effects of acidosis. This might explain some of the differences in the calculated NEg value for corn bran in the present experiment compared with the previous experiments.

Carcass weights were similar for steers fed diets containing corn bran (Table 3). Carcass weights of steers fed the corn control averaged 51 pounds heavier ($P < .05$) than those of steers fed diets containing corn bran. Twelfth rib fat thickness, USDA yield grade, and marbling score were similar among treatments.

The form of corn bran, dry, wet, or rehydrated, appears to have limited, if any, impact on the energy value of wet corn gluten feed. Because drying of corn bran alone has minimal effect on gluten feed, the reduced energy value of dried gluten feed with distillers solubles may be due to the extensive drying of steep (going from 50% DM to 90% DM) or the drying of corn bran in the presence of steep. Other factors such as the proportion of corn bran and steep liquor with distillers solubles (1999 Nebraska Beef Report pp. 29) appear to have the greatest nutritional impact on the finished product in the production of wet corn gluten feed.

Table 2. Effect of corn bran form on performance of finishing yearling steers.

	Treatment[a]				
Ingredient	Control	Dry Bran	Rehy Bran	Wet Bran	SEM
Initial wt., lb	629	622	626	626	14.7
Final wt.[b], lb	1195[c]	1120[d]	1118[d]	1106[d]	22.1
Dry matter intake, lb/d	21.0[c]	22.8[d]	20.9[c]	20.9[c]	.59
Daily gain, lb	3.88[c]	3.41[d]	3.36[d]	3.28[d]	.11
Feed/gain	5.46[c]	6.70[d]	6.27[d]	6.40[d]	.16

[a]Rehy=Corn bran rehydrated to similar moisture concentration compared with wet bran.
[b]Final weight calculated as hot carcass weight divided by a 63% dress.
[c,d]Means within a row not bearing a common superscript differ ($P < .05$).

Table 3. Effect of corn bran form on carcass characteristics of finishing yearling steers.

	Treatment[a]				
Ingredient	Control	Dry Bran	Rehy Bran	Wet Bran	SEM
Hot carcass wt., lb	753[b]	705[c]	704[c]	697[c]	13.9
12th rib fat thickness, in.	.34	.32	.28	.28	.04
KPH[d] fat, %	2.47	2.32	2.23	2.30	.10
Yield grade	1.93	1.93	1.93	1.93	.19
Marbling score[e]	4.83	4.86	4.51	4.55	.12

[a]Rehy=Corn bran rehydrated to similar moisture concentration compared with wet bran.
[b,c]Means within a row not bearing a common superscript differ ($P < .05$).
[d]KPH=kidney, pelvic, and heart.
[e]Marbling score; 4.5=Slight 50, 5.0=Small 0, etc.

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